REMARKS

Claims 1-3 and 5-33 are pending in this application. Claims 7-11 and 14-28 are withdrawn from consideration, and claims 1-3, 5, 6, 12, 13 and 29-33 are rejected. Claim 12 is currently amended. Reconsideration is requested.

Claims 1-3, 5, 6, 12, 13 and 29-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. 5,219,292 (Dickirson) in view of U.S. 6,608,258 B1 (Kwong). With regard to the conductive protrusions formed on the inner layer trace recited in claim 1 (and now also in claim 12), the Office cites Dickirson at column 4, lines 15-20. Applicant respectfully traverses. Dickirson mentions a conductive media, but explicitly fails to illustrate this feature.[1] In the written description Dickirson characterizes the feature as preferably being an adhesive such as conductive epoxy. Dickirson fails to mention any sort of discreet protrusions, and there is no teaching or motivation for forming the adhesive into protrusions. It is the understanding of Applicant that adhesives are normally applied over the entire mating surface at a uniform thickness. Applicant submits that if Dickirson had bothered to illustrate the feature, it would be an adhesive layer of uniform thickness across the mating surface, and that the Office is impermissibly reading limitations and teachings into Dickirson which are not supported by the reference. In other words, Dickirson fails to teach forming the conductive media into protrusions as recited in claims 1 and 12.

The inventors have found through experimentation that conductive protrusions can be highly effective in promoting good electrical contact between conductive traces. In particular, the protrusions improve electrical contact between traces on different circuit boards in the presence of normal imperfections in the flatness of the circuit boards being mated. In lab

prototypes the inventors were able to obtain significantly lower contact resistance with the protrusions than without them. Low contact resistance is critical for the very high frequency applications for which the invention was conceived.

In addition to being distinct from a conductive adhesive, the claimed protrusions have certain advantages over Dickirson's conductive adhesive. First, the adhesive would need to be carefully applied only to the traces, and the traces would need to be mated very carefully, in order to ensure that the conductive adhesive is not spread out in a manner that would cause short circuits between adjacent traces. This would inevitably drive up manufacturing costs and scrap rates. Second, once the conductive adhesive sets it would be difficult, perhaps impractical, to disconnect the mated circuit boards. For at least some applications the circuit boards must be capable of being disconnected and subsequently reconnected, e.g., to replace a failed board or install an upgrade board. Even assuming the Dickirson adhesive connection could be broken without damaging the traces, once the boards are disconnected one could not expect to be able reconnect them without first removing the old, hardened adhesive. Further, it would be impractical for a field service technician to apply new adhesive in the field reliably without shorting adjacent traces, so the procedure would have to be done at a dedicated facility. The claimed protrusions do not cause such problems. For example, protrusions formed by applying 0.120" of electroless nickel on a copper trace and then applying 0.030" electroless gold on the nickel,[2] will not spread and harden like an adhesive. As recited in claims 5 and 6, respectively, the protrusions may be malleable or resilient, rather than being liquid in an uncured state, and

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[1] "conductive media (not shown) may be placed between the pads 17 …" Column 4, lines 19-20.
[2] Spec at page 6, lines 1-5

rigid in a cured state like epoxy. Consequently, the Dickirson technique is inferior to the claimed invention for at least some applications.

With regard to claims 2 and 3, the Office states that the modified invention of Dickirson teaches that the conductive inner layer trace extends outward from the edge of the interconnection device, and at least a portion of the outer layer is removed to provide access to the trace. However, the Office cites no passage or figures in the references in support of the assertion. Clarification is therefore requested.

With regard to claims 5 and 32, the Office asserts that the conductive epoxy of Dickirson is malleable. That assertion is neither supported by the reference nor the art in general. Malleability is an indication of being able to be shaped or formed. Dickirson does not describe the properties of epoxy, other than that it is an adhesive. Those skilled in the art know that cured epoxy is hard and essentially non-malleable, and has a relatively short pot life during which it is liquid. Withdrawal of the rejections is therefore requested.

With regard to claims 6 and 33, the Office asserts that the conductive epoxy of Dickirson is resilient. That assertion is neither supported by the reference nor the art in general. Resilience is an indication of being able to be shaped or formed under force, and to subsequently return to an original shape following removal of the force. Again, Dickirson does not describe the properties of epoxy, other than that it is an adhesive. However, those skilled in the art know that cured epoxy is rigid, and essentially non-resilient, and has a relatively short pot life during which it is liquid. Withdrawal of the rejections is therefore requested.

For the reasons stated above, this application including all claims currently under examination is now considered to be in condition for allowance and such action is earnestly solicited. Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Applicants' Attorney at 978-264-4001 (x305) so that such issues may be resolved as expeditiously as possible.

Respectfully Submitted,

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Date

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